U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Sedum eastwoodiae*

COMMON NAME: Red Mountain stonecrop

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: November 3, 2005

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
___ New candidate
_X_ Continuing candidate
___ Non-petitioned
_X_ Petitioned - Date petition received: May 11, 2004
(Center for Biological Diversity et al. 2004)
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES
a. Is listing still warranted? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, most of our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov/).

___ Listing priority change
Former LP: ___
New LP: ___

Date when the species first became a Candidate (as currently defined): _1975_

___ Candidate removal: Former LP: ___

___ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F - Range is no longer a U.S. territory.

___ I - Insufficient information exists on biological vulnerability and threats to support listing.

___ M - Taxon mistakenly included in past notice of review.

___ N - Taxon may not meet the Act's definition of "species."

___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Crassulaceae (Stonecrop Family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Mendocino County, California

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Mendocino County, California

LAND OWNERSHIP
Twenty five of the 27 known occupied occurrences mapped or documented on Red Mountain (Jennings 2003) were located on Bureau of Land Management (BLM) lands. The remaining two polygons are located on lands owned by Coombs Tree Farm of Garberville, California, and Silver Peak Mining Company. Additional undocumented occurrences may exist on private land. Based on presence of suitable habitat in the area, proportional ownership, based on acres, is estimated as follows: BLM, 95 percent; and private, 5 percent.

LEAD REGION CONTACT: Diane Elam (Region 8) (916) 414-6464
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LEAD FIELD OFFICE CONTACT: Arcata Fish and Wildlife Office, David Imper (707) 822-7201; (email) david_imper@fws.gov

BIOLOGICAL INFORMATION
Due to the remoteness of all of the known habitat for this species, within and immediately surrounding the Red Mountain Area of Critical Environmental Concern (ACEC), the BLM maintains the most up-to-date information, regarding this species and its habitat. We have reviewed our files, the California Natural Diversity Data Base (California Department of Fish

and Game [CDFG] 2004), the online Inventory of Rare and Endangered Plants (California Native Plant Society [CNPS] 2005) and contacted the Arcata Office of BLM and various CDFG offices as part of updating this candidate form.

Species Description

Sedum eastwoodiae is a perennial succulent that stands 7-19 centimeters (cm) (2.7-7.1 inches [in]) tall. Leaves form rosettes that are 1-6 cm (0.8-2.7 in) in diameter, rosette leaves are 10-29 millimeters (mm) (0.8-1.14 in), widest ± 6 mm (0.34 in) below the tip, 2-5 mm (0.07 – 0.2 in) thick, rounded to barely notched. Leaves on the stem stalk are 4-17 mm (0.2 – 0.7 in), base truncate to rounded. Blooms are composed of 10-26 pink to dark red flowers; anthers light red to purple.

Taxonomy

Nathaniel Britton described this taxon as Gormania eastwoodiae in 1903, based on specimens from Red Mountain, Mendocino County, California which were collected by Alice Eastwood (Britton 1903). Fredrick Fedde changed the treatment to Cotyledon mendocinoana (Fedde 1904). Alwin Berger changed the treatment to Sedum eastwoodiae (Berger 1930). Robert Clausen reduced the species, renaming the species Sedum laxum ssp. eastwoodiae (Clausen 1975), using the same type material as used by Britton. Melinda Denton returned the species to Sedum eastwoodiae (Denton 1993).

Habitat/Life History

This species occupies relatively barren, rocky openings and cliffs, generally on west-faced slopes, in lower montane coniferous forest habitats. Soils are serpentine-derived.

Historical and Current Range/Distribution

This species appears to have always been rare, and is currently known to occupy an estimated 12 hectares (ha) (30 acres [ac]) of habitat scattered over about 10.4 square kilometers (4 square miles) located at Red Mountain, Mendocino County, California. This species is found between 580 and 1,250 meters (1,900 to 4,100 feet) in elevation (Jennings 2003).

Population Estimates/Status

Jennings (2003) mapped the majority of Sedum eastwoodiae occurring within the Red Mountain ACEC, which is owned by the BLM. Twenty-five occupied polygons encompassing an estimated 12 ha (30 ac) were mapped on BLM lands. Polygons ranged in size from less than 0.1 ha (0.25 ac) to nearly 4 ha (10 ac). Another two occupied polygons, not included in the survey, occur on private lands nearby. These two polygons probably encompass less than 0.4 ha (1 ac) (David Imper, USFWS Arcata Field Office, pers. comm. 2004). Jennings (2003) provided a conservative estimate of 5,300 plants as the minimum total population of Sedum eastwoodiae observed in his survey effort. Based on a more accurate estimate of number of plants within three polygons and extrapolating to the entire occupied habitat area, Jenning's data suggest the total population may range as high as 23,000 plants. The above estimates of occupied habitat and population do not include potential habitat located on the steep slope above Cedar Creek and on private lands in the vicinity. The unsurveyed areas, included within the estimate of occupied range described above, are not expected to contribute more than 10-20 percent to the estimate of total occupied habitat and population.

Dr. Michael Baad monitored eight 5 square-meter (16 square feet) permanent plots within 4 general areas of Red Mountain annually from 1987 to 1998, and again in 2002 (Baad 2002). Individuals were counted and mapped in each plot and classified as seedlings, non-reproductive or reproductive. Sedum eastwoodiae canopy coverage in the plots decreased from a high of 630 square centimeters/plot (98 square inches/plot) in 1988 to a low of 415 square centimeters/plot (64 square inches/plot) in 1993, rebounding to 627 square centimeters/plot (97 square inches/plot) in 1995 (Baad 1998). Sedum eastwoodiae densities from year-to-year showed a pattern of higher stability, apparently more a function of strong survivorship than consistent recruitment (Baad 2002). One of the plots was lost due to a rockslide prior to the 2002 sampling period (Baad 2002). Seedling success and inflorescence production varied with even greater amplitudes than canopy coverage over the 16 years of the study (Baad 2002).

From 1987 through 1998, the Sedum eastwoodiae located within the permanent study plots experienced little human impact (Baad 1998).

Virtually all of the historic occurrences mapped by Baad on BLM land in 1986 (CDFG 2004) were relocated by Jennings (2003). However, the low resolution of the 1986 mapping effort and the limited scope of the 2003 mapping effort prevented our making any conclusions regarding population trends.

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range. The primary threat to this species is the potential for future mining activities, both on public and private lands. Although mining does not now occur in the species' habitat, potential future surface nickel, chromium, and cobalt mining threaten this species (Baad 1994; M. Finan, U.S. Army Corps of Engineers, Sacramento Office, pers. comm. 1994; Jennifer Wheeler, BLM, Arcata Field Office, pers. comm. 2001; Mary Ann Showers, CDFG, Sacramento Office, pers. comm. 2005). The extent of future mining will depend on the future economic feasibility and demand for minerals found in the area.

Between 5 and 20 percent of the occupied habitat for Sedum eastwoodiae is thought to be privately owned, which is largely unprotected against mining. The remainder of the species' habitat occurs within the Red Mountain ACEC, which is covered to varying extent by approximately 76 mining claims (Dan Averel, BLM Arcata Field Office, pers. comm. 2004). Two claimants hold the majority of claims. Designation as an ACEC merely requires BLM review and approval of a plan of operations for all mining activities (Whitcomb 1989). Although the ACEC was withdrawn from mineral materials sales in 1989, it remains open to entry for locatable or leasable minerals under the 1872 Mining Law (BLM 1995).

Any mining operation on Red Mountain would most likely be an open-face bench type that would involve removal and processing of the mineral-bearing ore containing nickel, chromium, and cobalt (BLM 1988). All vegetation and habitat for Sedum eastwoodiae would be removed in the affected area. Ore would be processed on public or adjacent private lands. Overburden and processed soil disposal areas would be needed, along with a transportation system, perhaps involving cable trams across Cedar Creek Canyon (BLM 1988). The holder of the mining

claims could engage in a validation process of their mining claims and thereby be granted patent to the lands on Red Mountain. If the lands were to be patented into private ownership and mining commenced, neither the U.S. Fish and Wildlife Service (USFWS) nor the BLM may offer any protection for the species beyond elevating the profile and plight of the plant species in an emergency listing.

Habitat modification as a result of natural successional changes in absence of fire also appears to be a primary threat to this species, at least in the long term. Baad (2002) recognized the threat from vegetation encroachment to at least 3 rare plants known from Red Mountain, including Sedum eastwoodiae, Eriogonum kelloggii (Red Mountain buckwheat) and Arabis mcdonaldiana (McDonald's rockcress). He attributed suppressed reproductive output in Eriogonum kelloggii and Arabis mcdonaldiana at one site to conifer invasion following fire 40 years ago. Although Baad's monitoring plot data for Sedum eastwoodiae have not demonstrated an impact from encroaching vegetation, the plots appear generally located in relatively open habitat probably not as sensitive to rapid successional changes over the 18 year monitoring history. Clearly, the rate at which habitat becomes unsuitable in absence of fire varies. In absence of fire, populations of Sedum eastwoodiae located on rocky ridge tops and with little woody vegetation appeared relatively stable, but populations situated on deeper soils in more sheltered sites are more vulnerable to shading by competing vegetation (Baad 2002).

Where Sedum eastwoodiae occurs in semi-forested habitat, it is also subject to impact by logging operations, such as disturbance from cable logging (Clare Golec, CDFG, Ft. Bragg Office, pers. comm. 2005).

Of course, the genetic implications of habitat fragmentation, genetic isolation and declining effective population size are generic threats (Saunders et al. 1991; Meffe and Carroll 1997).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

None known at this time.

C. Disease or predation.

No threat of disease or predation is known at this time. Unidentified rodent species have been known to sever flowering stems before plants set seed (Ken Fuller, USFWS, Sacramento Office, pers. comm. 1994).

D. The inadequacy of existing regulatory mechanisms.

Sedum eastwoodiae receives limited protection under existing State laws. The species is not listed by the State of California, but it is included on the CNPS's List 1B. As a list 1B species, projects located on private lands and subject to review under the California Environmental Quality Act must disclose potential for impacts on the species. The species is listed as sensitive by the BLM, which provides limited protection for that portion of the distribution located on BLM lands.

E. Other natural or manmade factors affecting its continued existence.

The small number of populations and individual plants make this species more vulnerable to random environmental events.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:
No conservation measures were implemented in 2005 for Sedum eastwoodiae. Previous conservation measures included initiation of the long term life history and population monitoring in 1987 (Baad 2002); field mapping of occupied habitat on public lands in 2003 (Jennings 2003); and general ongoing public outreach activities such as public field trips and academic visitation.

Designation of 6,173 acres of BLM property at Red Mountain as a wilderness study area (WSA) in 1979, and 6,895 acres as an ACEC/Research Natural Area (RNA) in 1984 has to some extent focused management concern and direction toward conservation of the unique botanical and soils values, old growth forest, raptor habitat and anadromous fisheries (BLM 1995, 1996). Annual visits are conducted by BLM staff in conjunction with the WSA status, to ensure that no new road construction occur (Jennifer Wheeler, BLM Arcata Field Office, pers. comm. 2005). Most, or all, of the occupied or suitable habitat for Sedum eastwoodiae in the vicinity of the Red Mountain ACEC was recommended for acquisition (subject to willing landowners) in the Resource Management Plan (RMP) for the area (BLM 1995). The RMP also excludes livestock grazing and off-road vehicle use from the ACEC.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

Primary threats to this species include destruction of its habitat as a result of surface mining, and modification of its habitat by encroaching vegetation as a result of fire exclusion.

For species that are being removed from candidate status:
_____ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES:
Habitat occupied by Sedum eastwoodiae should be withdrawn from all minerals entry under the 1872 Mining Law.

Subject to landowner authorization, the extent of Sedum eastwoodiae occurrence on adjacent private property should be documented.

Conservation measures recommended for implementation in 2006, but without firm staff or funding commitment at this time, include:
1) Collect field data necessary to develop a baseline population estimate for the species.
2) Resample and review Baad's (2002) permanent monitoring plots to determine if they adequately address the long term threat from vegetation encroachment;
3) Investigate the fire history within Sedum eastwoodiae habitat;
4) If warranted, begin agency coordination and fieldwork in preparation for experimental

reintroduction of fire into Sedum eastwoodiae habitat.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	**5***
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:
Magnitude:
Magnitude of threat to Sedum eastwoodiae is rated high. The entire population is either privately held by a mining interest or covered under existing mining claims. Sedum eastwoodiae distribution is currently highly fragmented, consisting of approximately 27 relatively small polygons scattered over 10.4 square kilometers (4 square miles). While some colonies or populations may persist if the area is mined, the increased fragmentation and reduction in overall population are potential significant factors affecting population viability. Based on the observed close affinity of this species with native soils, mining may render the affected habitat unsuitable for the species for a significant period.

Imminence:
Imminence of threat is rated non-imminent. Mining activity is not currently affecting Sedum eastwoodiae or its habitat. Any proposed mining would be subject to an application process, during which BLM would treat the Sedum eastwoodiae as if it were currently proposed for listing, and request conferencing (optional) with the USFWS. The mining claim would also have to proceed through the validation process.

Without periodic fire affecting vegetation structure and composition within its habitat, we expect Sedum eastwoodiae will ultimately decline over the majority of its range due to encroachment by shrubs and trees. The rate at which surrounding vegetation structure and composition, in absence of fire, will negatively affect Sedum eastwoodiae is unknown. Due to the slow growth rates typically exhibited on serpentine-derived soils, the rate at which habitat becomes unfavorable for Sedum eastwoodiae will likely be slow at least in portions of its distribution.

Rationale for Change in Listing Priority Number (insert if appropriate) NA

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted?
Emergency listing is not warranted at this time, based on the following: a lack of current mining activity either on public or privately held lands in the Red Mountain area; and any mining proposed on BLM lands would be subject to conferencing (optional) with the USFWS .

DESCRIPTION OF MONITORING:
The Red Mountain ACEC is quite remote, surrounded by private landowners, and requires authorization from private parties for access. BLM and/or USFWS personnel generally visit the Red Mountain site on an annual basis to conduct a general reconnaissance and generally assess the status of the species. The USFWS and BLM maintain routine contact, regarding the Red Mountain site. BLM personnel are routinely in contact with the Coombs Tree Farm Company (private owner), in conjunction with requesting access through their property to the Red Mountain ACEC.

The only past monitoring of this species was conducted by Dr. Michael Baad. Monitoring focused on the plant life history and site-specific trends in population over time. Permanent plots are located at three study sites within the Red Mountain ACEC. The plots were read annually between 1987 and 1998, and again in 2002. Individual plants were counted, mapped, measured, and classified as to reproductive class (Baad 2002). This monitoring will be implemented periodically in the future at perhaps 3- or 4-year intervals, subject to available funding by both BLM and USFWS.

In June and September 2003, Sedum eastwoodiae was mapped throughout the majority of the BLM Red Mountain ACEC to gather baseline data on its distribution (Jennings 2003). No accurate distribution maps or current population estimates existed prior to this survey. Limited abundance data were collected from three of the mapped polygons. The mapping effort was conducted to provide the basis for an accurate baseline estimate of population size, which will be conducted in the future, depending on available funds and staffing.

Given the remote nature of Sedum eastwoodiae habitat, current low susceptibility to human impacts, and relatively stable nature of the habitat from an ecological standpoint, the current frequency of monitoring is considered adequate to detect any significant threats. However, the location of monitoring plots should be assessed to determine their adequacy for representing the variation in habitats and conditions across the Sedum eastwoodiae range, particularly with respect to susceptibility to habitat modification as a result of fire exclusion.

COORDINATION WITH STATES
Input regarding species status and agency coordination was requested from the State of California, Department of Fish and Game (Attn: Craig Martz, Redding Office; Karen Kovacs and Gordon Leppig, Eureka Office; Mary Ann Showers, Sacramento Office; Roxanne Bittman,

California Natural Diversity Database, Sacramento; Clare Golec, Ft. Bragg Office) on October 21, 2005.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Paul Henson April 26, 2006
Acting CNO Manager, Fish and Wildlife Service Date

Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005
Conducted by: David Imper